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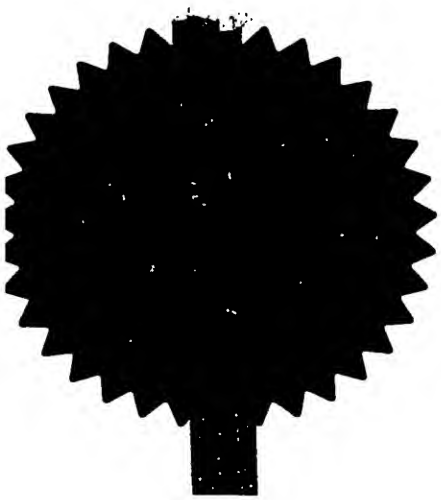

Signed Stephen Hardy.

Dated 28 October 2004

Patents Form 1/77

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26 JUL 2003
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28 JUL 2003
EFFECTIVE DATE
26 JUL 2003

P34550-/GB/0

1/77

P01/7700 0.00-0317532.0

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
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NP10 8QQ

1. Your reference — P34550-/SSI/GEM

2. Patent application number *(The Patent Office will fill in this part)* — 0317532.0

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Teknek Electronics Limited
River Drive
Inchinnan Business Park
Renfrewshire PA4 9RT

Patents ADP number *(if you know it)* — 07641947001

If the applicant is a corporate body, give the country/state of its incorporation — United Kingdom

4. Title of the invention — Apparatus for Cleaning Surfaces

5. Name of your agent *(if you have one)*

Murgitroyd & Company

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

Scotland House
165-169 Scotland Street
Glasgow
G5 8PL

Patents ADP number *(if you know it)* — 1198015✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

Yes

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	
Description	8
Claim *(s)*	-
Abstract	-
Drawing *(s)*	9 + 9

10. If you are also filing any of the following, state how many against each item.

Priority documents	-
Translations of priority documents	-
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	-
Request for preliminary examination and search *(Patents Form 9/77)*	-
Request for substantive examination *(Patents Form 10/77)*	-
Any other documents *(please specify)*	-

11. I/We request the grant of a patent on the basis of this application.

Signature Murgitroyd & Co. Date 25 July 2003

Murgitroyd & Company

12. Name and daytime telephone number of person to contact in the United Kingdom — Edward Murgitroyd — 0141 307 8400

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) *If you need help to fill in this form or you have any questions, please contact the Patent Office on 08459 500505.*

b) *Write your answers in capital letters using black ink or you may type them.*

c) *If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*

d) *If you have answered 'Yes' Patents Form 7/77 will need to be filed.*

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"Improvements in Cleaning Machines"

This invention relates to cleaning machines of the type using a cleaning roller and an adhesive roll for removing contamination from planar workpieces such as phototools and screens for LCD displays.

Machines of this type are well known, and make use of a cleaning roller having a surface of relatively low tackiness in contact with an adhesive roll of relatively high tackiness. The workpiece is passed over the cleaning roller which picks up contaminants which are then transferred to and retained by the adhesive roll. Commonly, the workpiece is passed between two cleaning rollers, each with its own adhesive roll, to clean both sides of the workpiece simultaneously.

A known problem with such machines is that, if the cleaning roller and the adhesive roll are left stationary and in contact with each other, "wetting" or transfer of adhesive from the adhesive roll to

the cleaning roller will occur, which will have an adverse effect on the operation of the cleaning roller. This problem has previously been addressed in a number of ways.

The simplest provides a manually operable means such as a lever which the operator can use to separate the cleaning roller(s) from the adhesive roll(s). This requires only a simple mechanism, but there is a high probability of the operator using the system incorrectly. In particular, there is no fail-safe mechanism if the power to the machine is cut off.

A common approach is to move the mounting of the adhesive roll by pneumatic cylinders. However, this requires the use of pneumatic cylinders and the provision of a compressed air supply and a suitable electro-pneumatic control system. This adds considerably to the cost and complexity of the apparatus.

It is also known to produce relative movement between cleaning roller(s) and adhesive roll(s) by means of solenoids or electromagnets, but arrangements for doing this have hitherto been mechanically cumbersome and have required relatively complex control circuitry.

A further feature of cleaning machines of this general type is that it is necessary from time to time to remove the cleaning rollers and the adhesive rolls, for example to perform extra cleaning on the

cleaning rollers or to replace these, and to expose fresh areas of adhesive on the adhesive rolls or to replace these. It is known to mount the cleaning rollers and adhesive rolls in a removable cartridge, in an attempt to facilitate these operations. However, known cartridge systems are not provided with systems to avoid stationary contact between cleaning roller and adhesive roll.

The present invention provides a cleaning machine for cleaning one or both surfaces of a planar article, the machine having a base unit and a roller cartridge removably insertable into the base unit, the roller cartridge comprising at least one cleaning roller and a cooperating adhesive roll mounted for relative movement between an operating position in which the cleaning roller and the adhesive roll are in contact and a non-operating position in which the cleaning roller and the adhesive roll are out of contact, and in which the machine base and the roller cartridge are provided with inter-engaging formations which produce said relative movement as the roller cartridge is inserted into and removed from the machine base.

Typically there are two opposed cleaning rollers, each having a respective adhesive roll.

Said inter-engaging formations may suitably be formed by shaped slots formed in side walls of the machine base and projections, such as pins or

rollers, on the roller cartridge. Said projections may suitably be arranged to produce movement of a slide plate against a resilient bias, the slide plate being formed with one or more cam surfaces controlling the position of the adhesive rolls.

Preferably, a latch means is provided for retaining the roller cartridge in an operating position. The latch means may comprise an electromagnet which may conveniently be energised and de-energised along with a drive motor for the cleaning rollers.

Embodiments of the invention will now be described, by way of example only, with reference to the drawings, in which:

Fig. 1 is an isometric view of a cleaning machine forming one embodiment of the invention, in an operating condition;

Fig. 2 is a similar view of the same machine in a non-operating condition;

Fig. 3 is a similar view of the machine of Fig. 1 with a roller cartridge removed;

Fig. 4 is an isometric view corresponding to Fig. 3 but taken from another angle;

Fig. 5 is an isometric view corresponding to Figs. 3 and 4 from the rear;

Fig. 6 is an isometric view of the roller cartridge in a non-operating condition;

Fig. 7 is a view similar to Fig. 6 showing the cartridge in an operating condition;

Fig. 8 is a perspective schematic view illustrating a second embodiment;

Fig. 8A is a detail of tracks in the machine of Fig. 8; and

Fig. 9 is a perspective schematic view illustrating a further embodiment.

Referring to Figs. 1 to 7, a cleaning machine comprises a base unit 10 and a removable roller cartridge 12.

Referring particularly to Figs. 3-5, the base unit 10 has a base 14 and upstanding side plates 16. An electric motor 18 (best seen in Fig. 3) drives a pinion 20 which in turn drives a drive gear 22. An in-feed conveyor 24 and an out-feed conveyor 26 are driven via pinions 28 and belts 30.

The drive gear 22 has the function of powering the roller assembly, as will be described below. It will also be noted from Figs. 3-5 that inward faces of the side plates 16 are formed with shaped slots 32. An electromagnet 34 is secured to the base 14.

Referring now particularly to Figs. 6 and 7, the roller cartridge 12 includes a pair of cleaning rollers 36a and 36b journalled for rotation in side members 38a,b and biased together by resilient means (not seen) to form a resilient nip. The cleaning rollers 36 are driven, when the cartridge is in the operational position, by the drive gear 22 via a pinion 42.

Each cleaning roller 36a,b is associated with a respective adhesive roll 40a,b. When the cleaning machine is in operation, each cleaning roller 36 is brought into contact with its adhesive roll 40 as seen in Fig. 7, whereas when the machine is not in operation the adhesive roll 40 is caused to move out of contact with the cleaning roller 36, as seen in Fig. 6. The nature of this operation will now be further described.

The adhesive rolls 40 are journalled in flanged wheels 43 which are biased together by tension springs at either end, one of which is seen at 44. The flanged wheels engage oblique cam faces 46 formed in slide plates 48 each of which is slidably mounted on the respective side member 38 by means of pins 50 and slots 52. The slide plates 48 are biased by tension springs 54 to the position seen in Fig. 6.

Each of the slide plates 48 is provided with a pair of spaced upstanding pins or rollers 56 for engagement with the shaped slots 32 in the side plates 16 of the base unit 10.

In use, the roller cartridge 12 is inserted downwardly into the base unit 10. The base unit side plates 16 are formed with straight shoulders 58 (Figs. 3-5) which act as guides for the side members 38 of the roller cartridge 12. The pins or rollers 56 engage against the shaped slots 32. The roller

cartridge 12 will move essentially by gravity to the condition shown in Fig. 2 with the cartridge in the condition shown in Fig. 6. By exerting downward pressure, the user can then push the cartridge 12 to the position shown in Fig. 1, and during this movement a camming action between the slots 32 and the pins or rollers 56 brings the cartridge into the condition shown in Fig. 7 with the cleaning rollers 36 in contact with their adhesive rolls 40.

In the embodiment shown, the cleaning machine is maintained in this operational condition by means of the electromagnet 34 being activated to exert an attracting force on an armature magnet 60 secured to the underside of the cartridge 12. By connecting the electromagnet 34 in series with the driving motor 18, it can be ensured that whenever the driving motor 18 is deactivated, so also is the electromagnet 34 thus allowing the springs 44 to return the machine to the condition of Fig. 2. It will be apparent that other forms of latching mechanism could be used.

The cleaning machine thus provides a roller cartridge which can be removed and replaced in a simple manner for maintenance or replacement of the rollers, combined with a convenient and economical arrangement to ensure that the cleaning rollers do not remain in contact with their adhesive rolls when stationary, for example when the power supply fails.

Fig. 8 shows an alternative and simplified embodiment, in which a substantially complete cleaning machine 112 is inserted sideways in a simple base unit 110. The machine 112 contains the required drive motor and a latching electromagnet, the armature magnet 160 being fixed to the base unit 110. Fig. 8a shows the nature of the slots 132 which are engaged by offset pins 158 on the machine 112.

Fig. 9 shows a concept similar to that of Fig. 8, with a removable machine 212 being insertable in a simple base unit 210 suitable for desk-top use.

The preferred embodiments of the invention thus provide cleaning machines which combine the convenience of a roller cartridge with a simple fail-safe means for avoiding stationary contact between the cleaning rollers and the adhesive rolls.

Modifications and improvements may be made to the foregoing embodiments within the scope of the present invention.

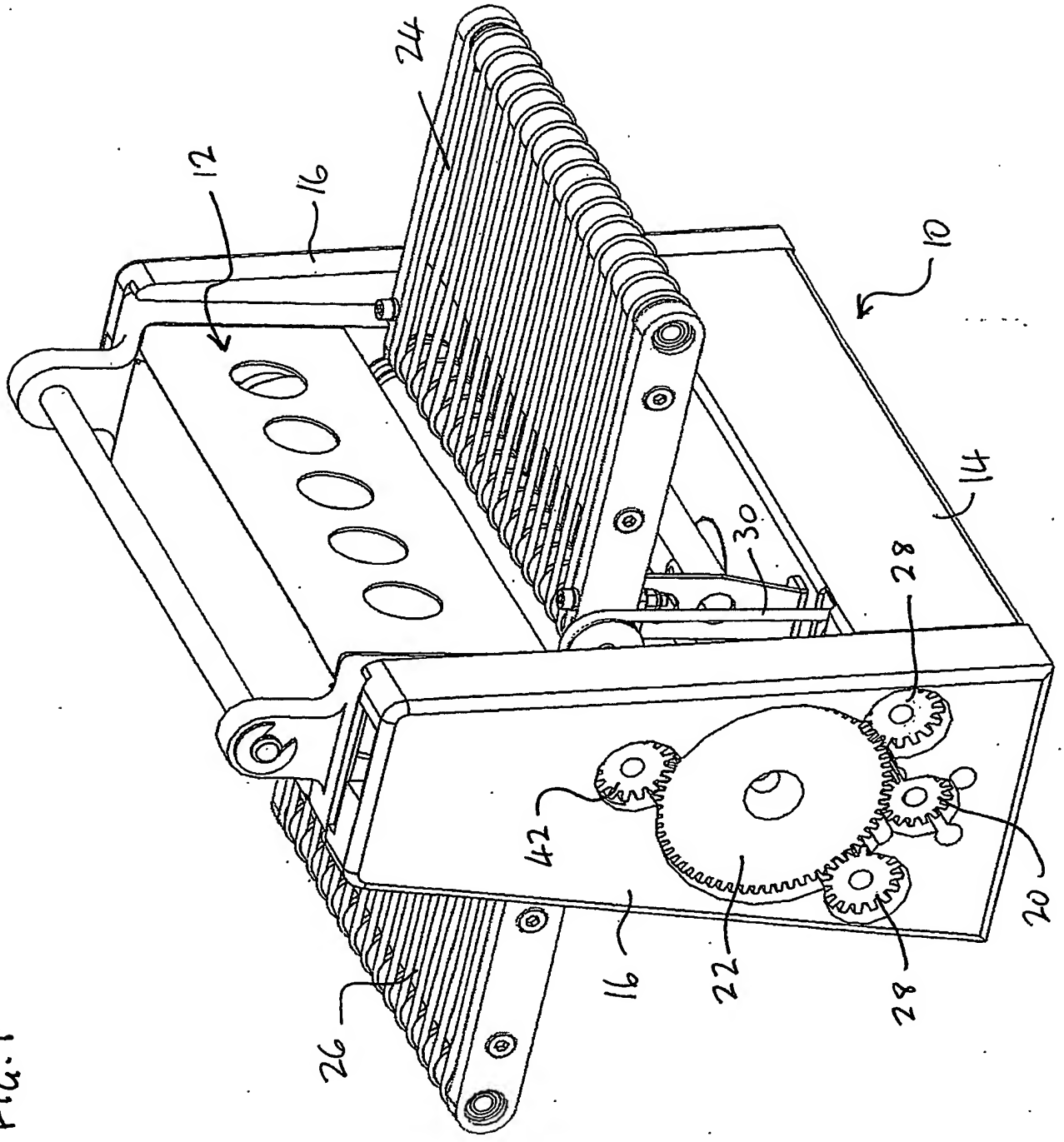


FIG. 1

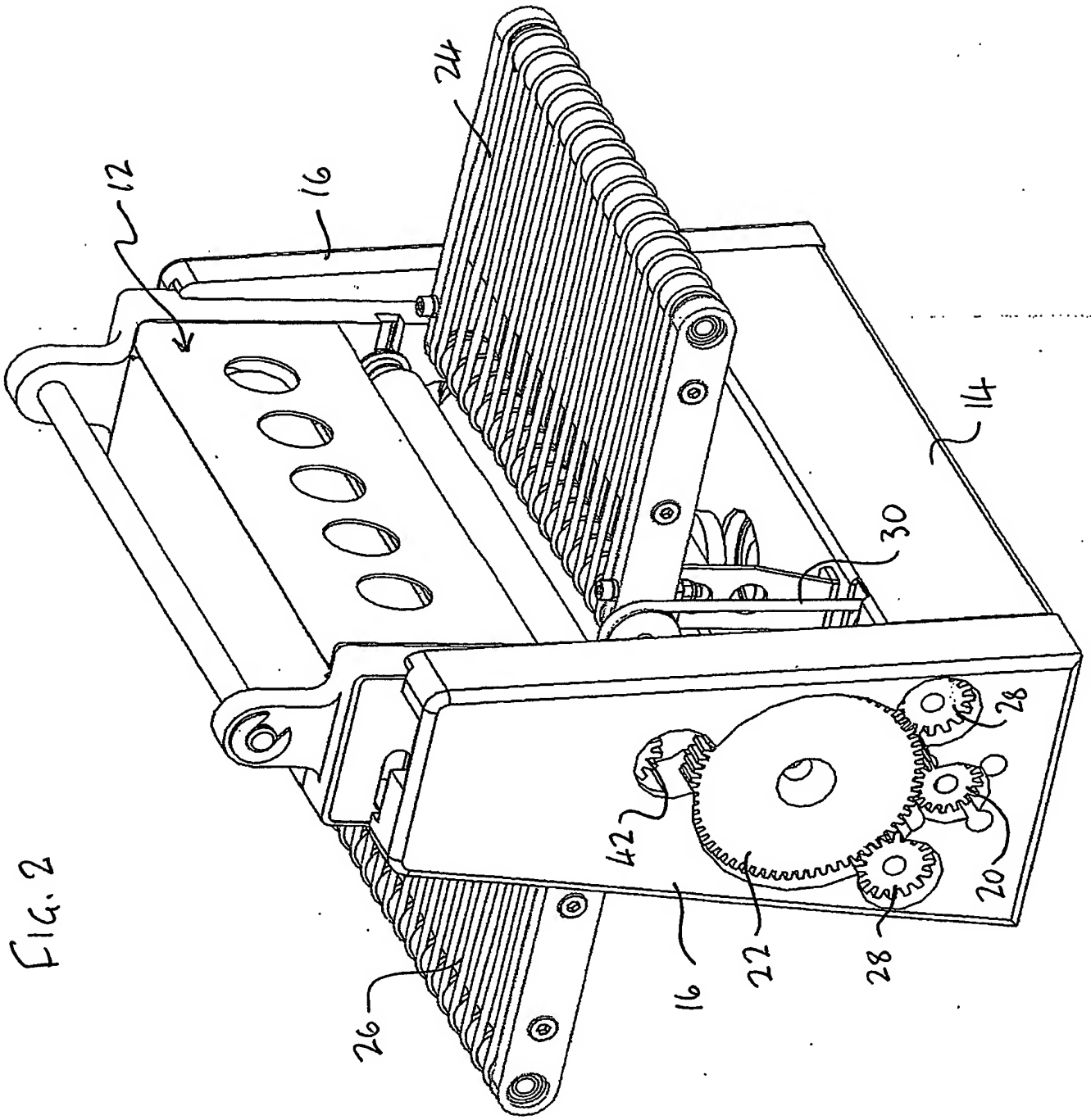


FIG. 2

FIG. 3

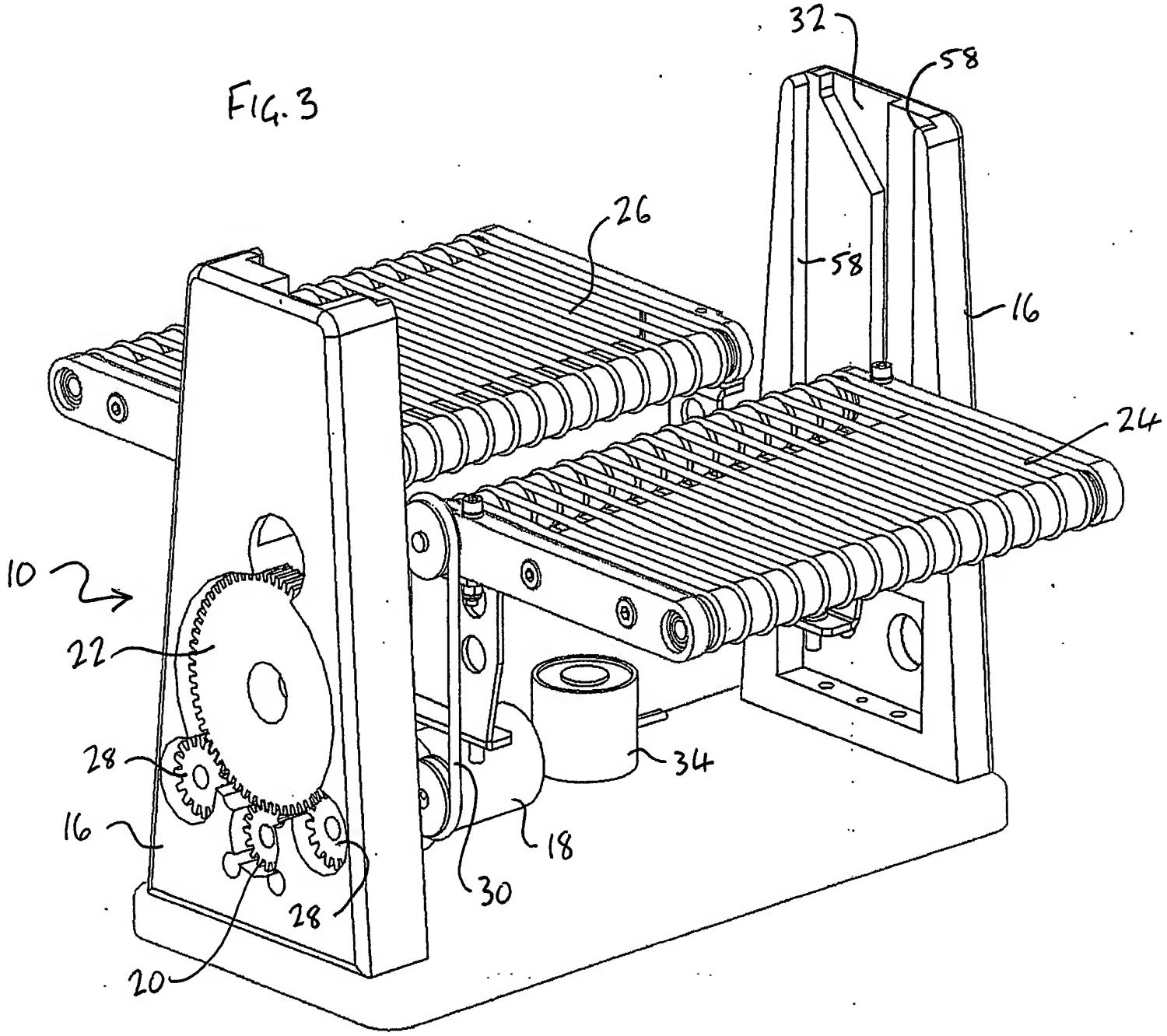
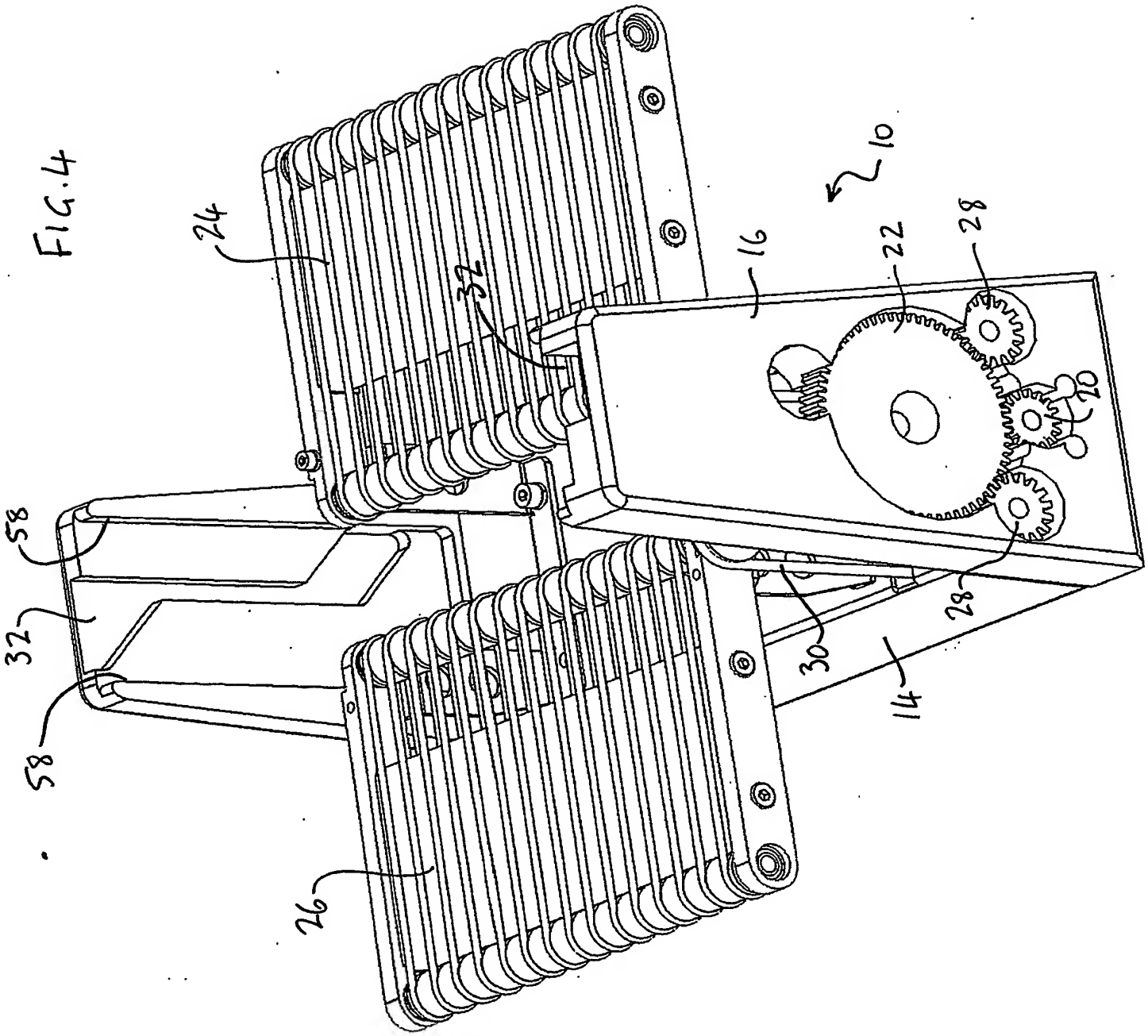


FIG. 4



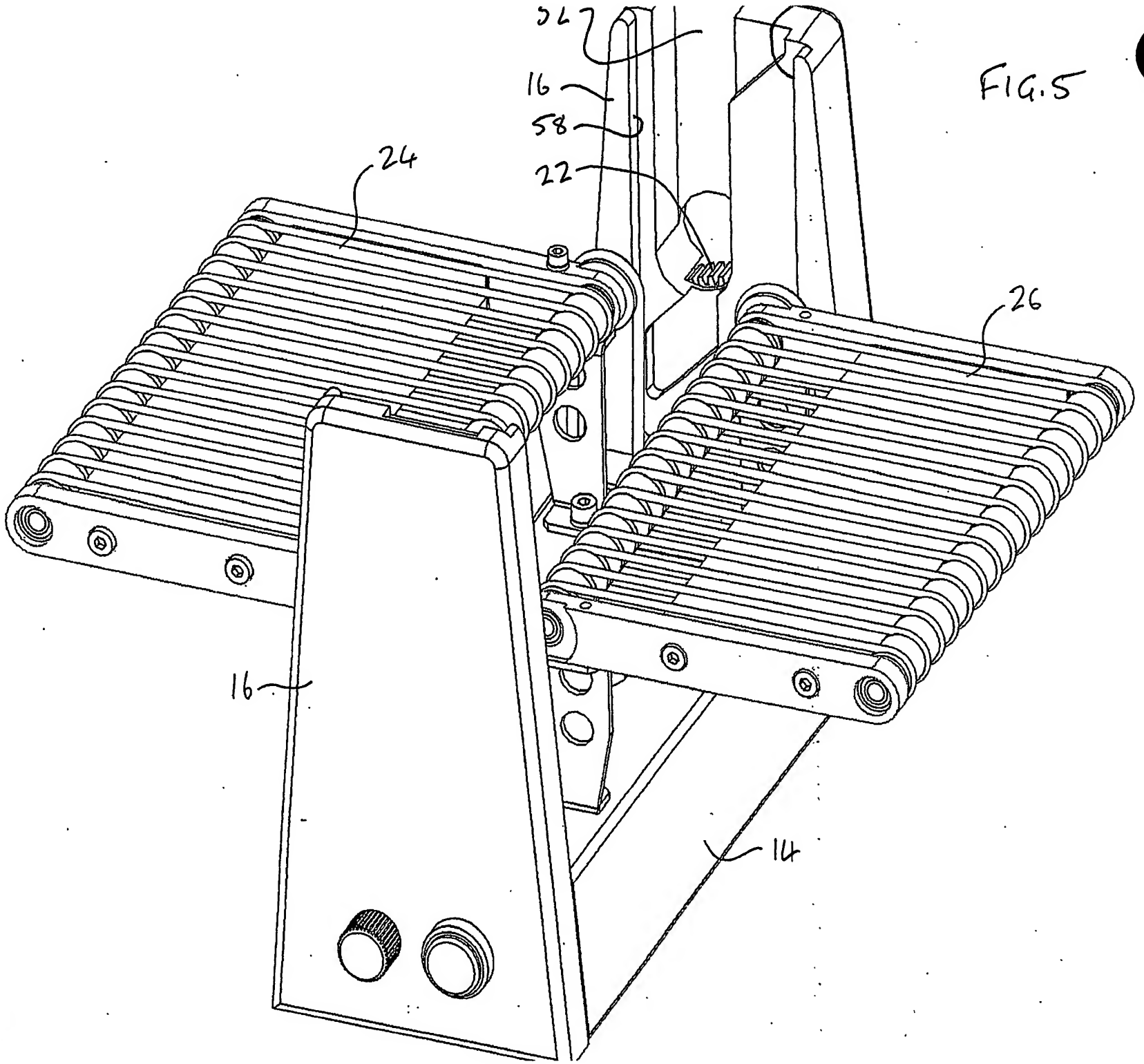
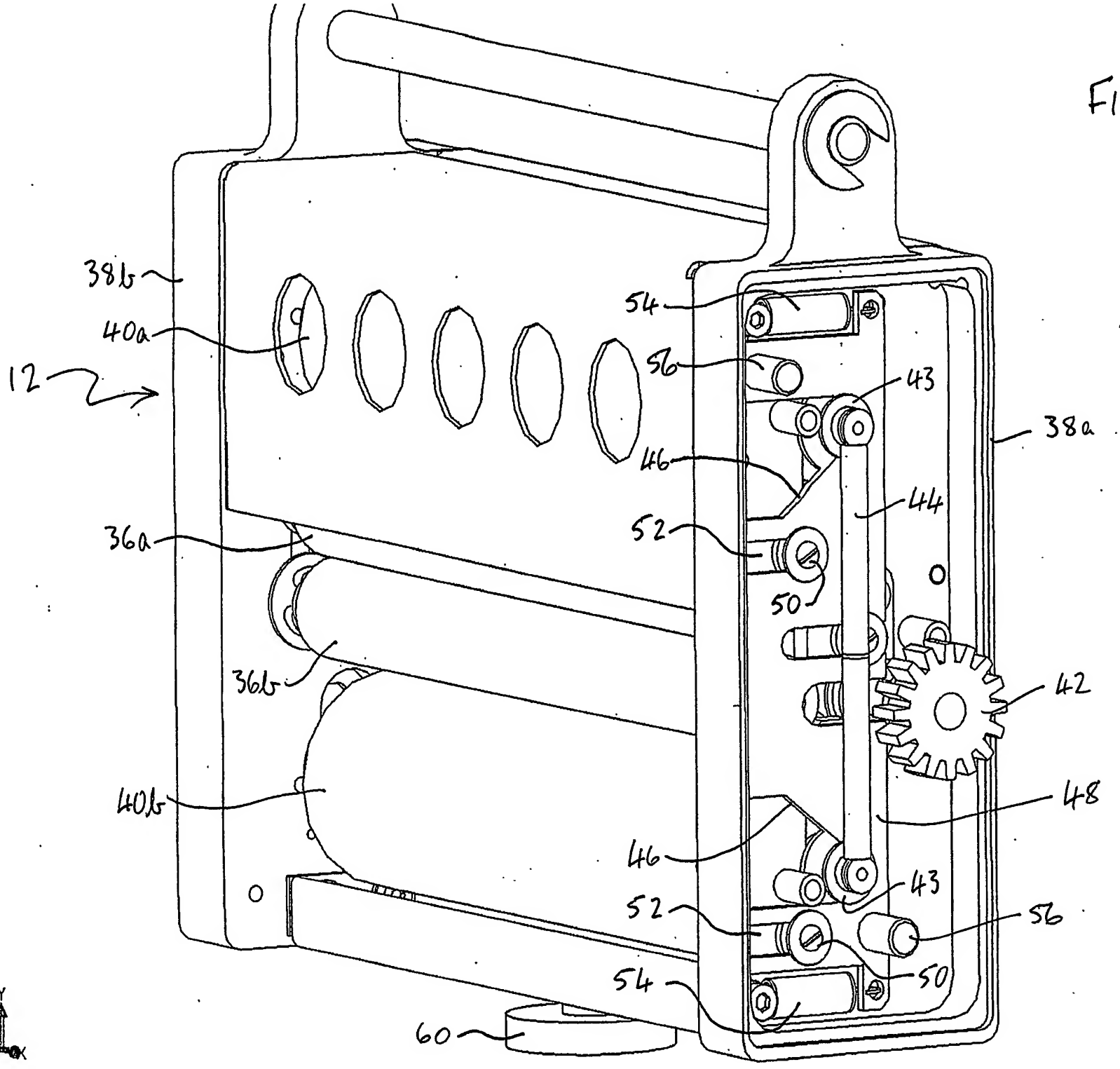


FIG. 5

Fig. 6



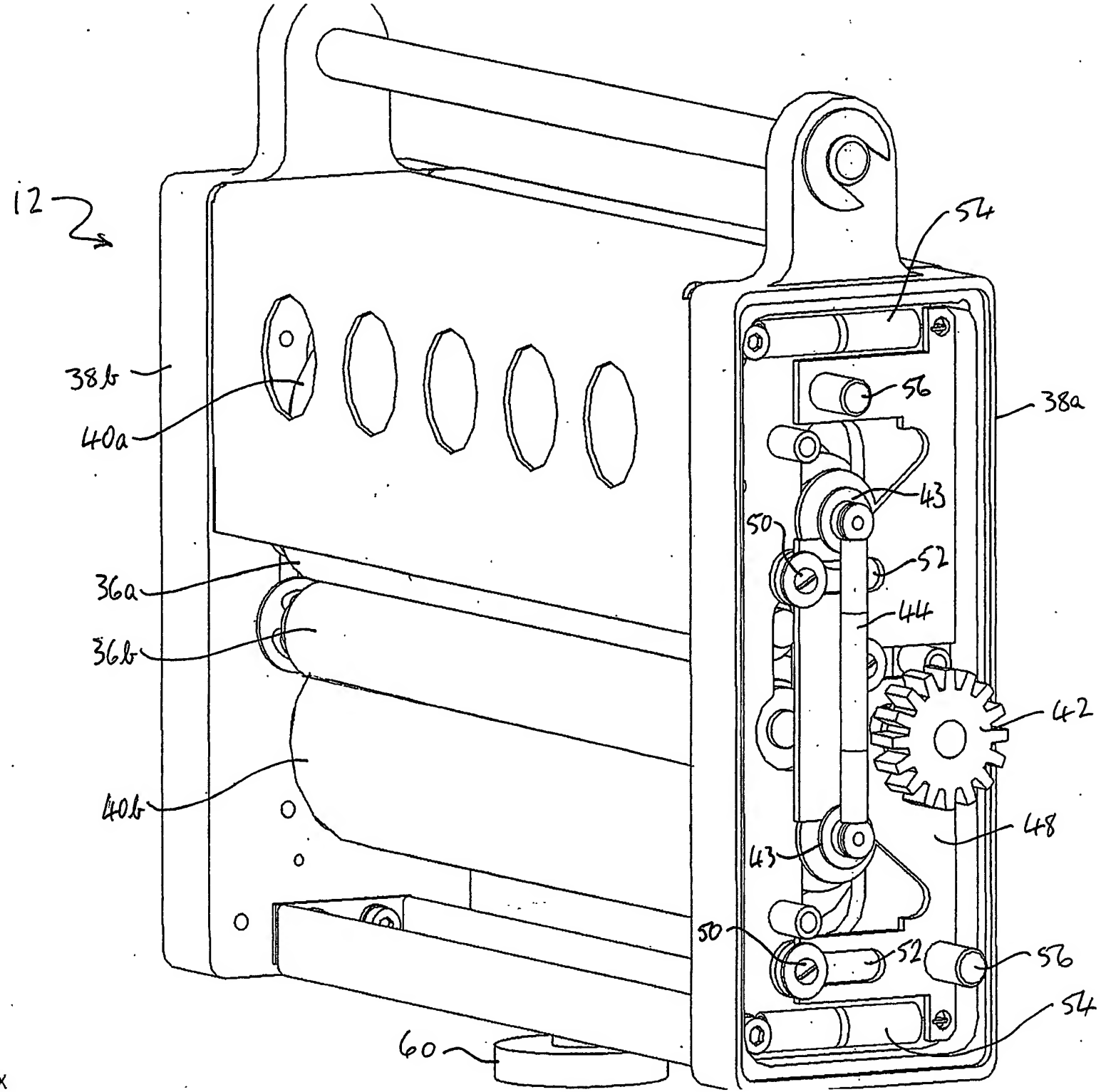

12
54
38b
56
38a
40a
43
50
52
36a
44
36b
42
40b
48
43
50
52
56
54
60
Y
Z
X

FIG. 7

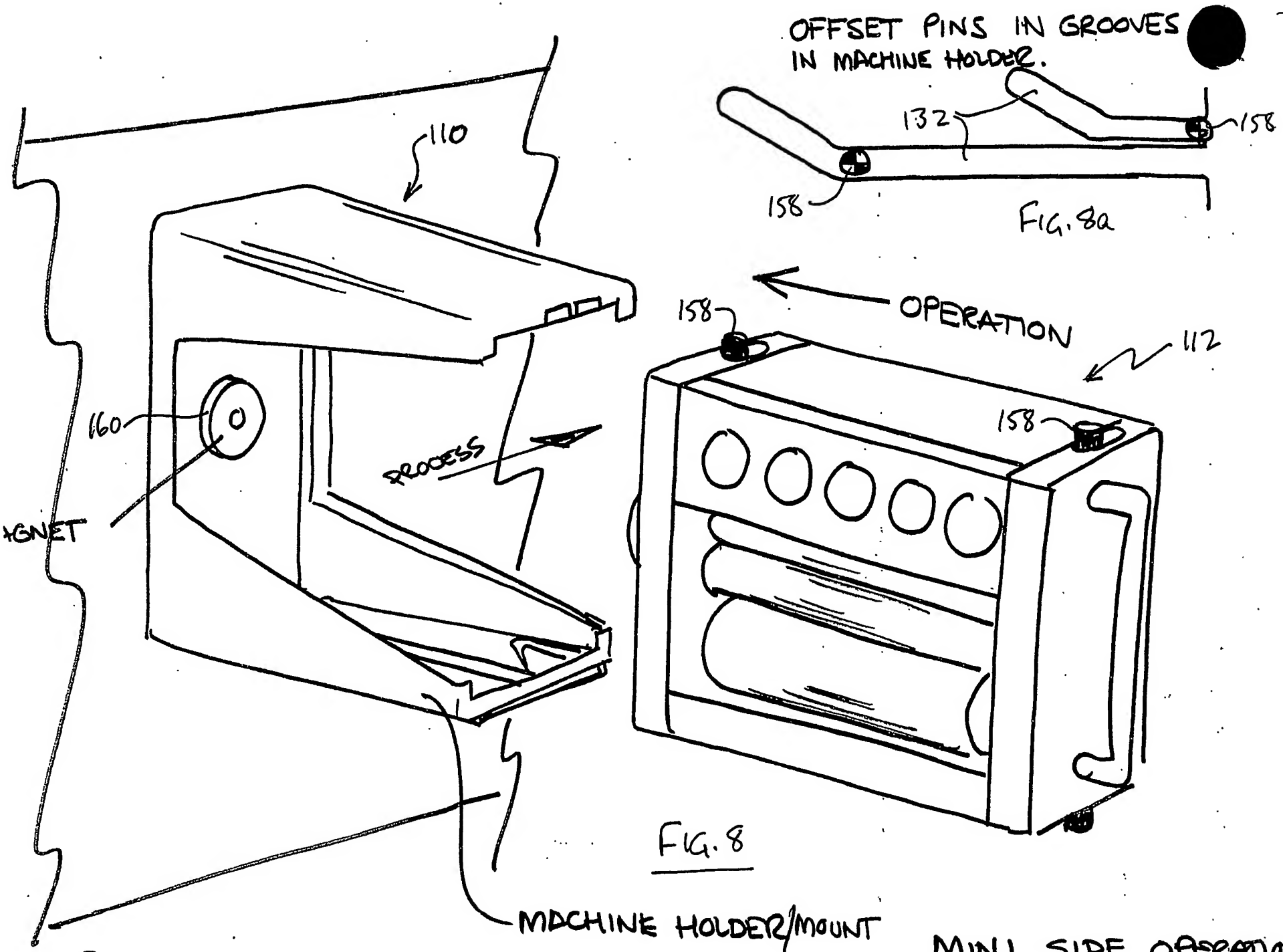


FIG. 8a

FIG. 8

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MINI SIDE OPERATION

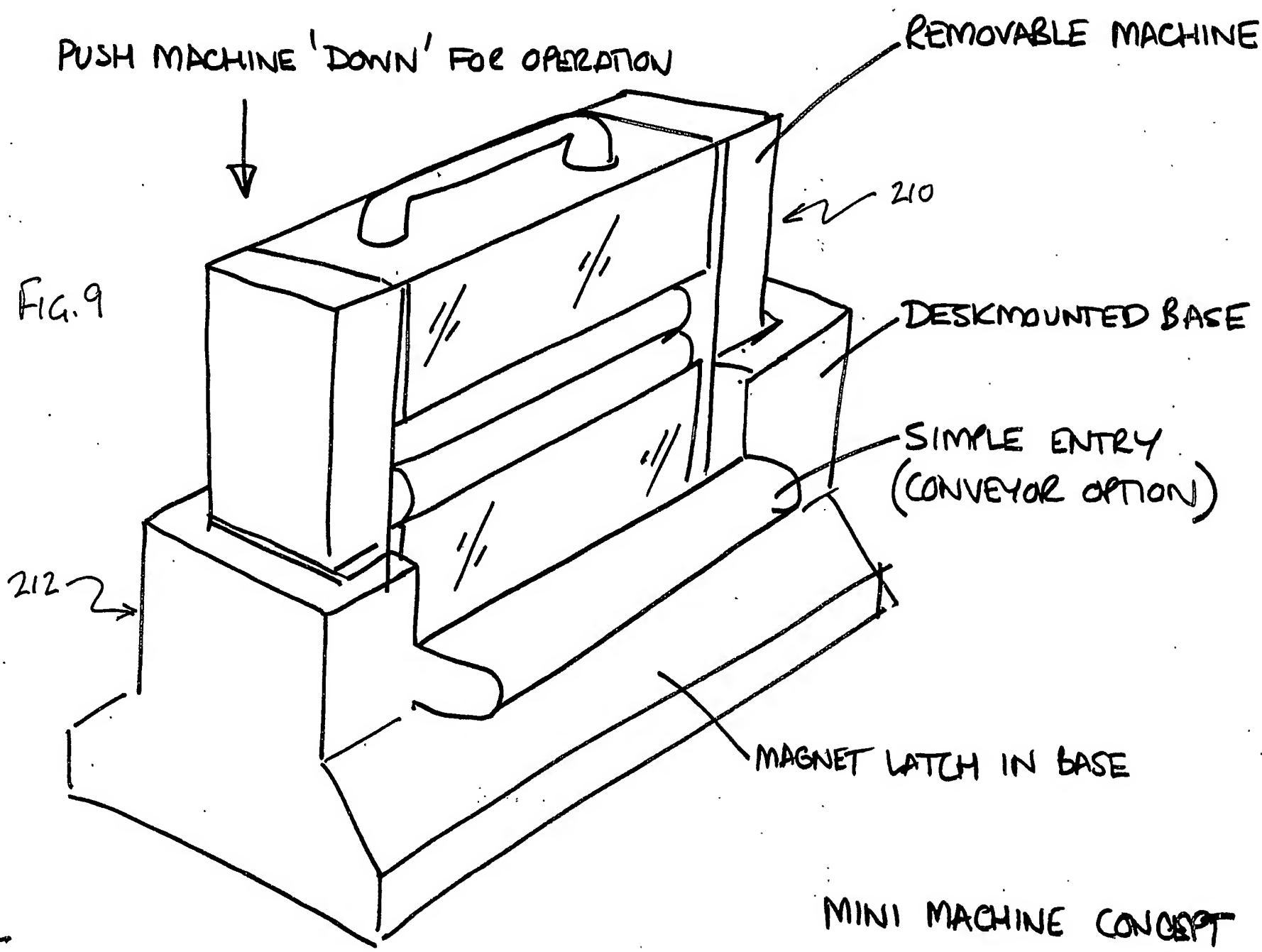

FIG. 9

WBC

MINI MACHINE CONCEPT